Explaining Russian manufacturing exports: Firm characteristics and external conditions

Donato de Rosa

PARIS-JOURDAN SCIENCES ECONOMIQUES
48, BD JOURDAN – E.N.S. – 75014 PARIS
TEL. : 33(0) 1 43 13 63 00 – FAX : 33 (0) 1 43 13 63 10
www.pse.ens.fr

WORKING PAPER N° 2006 - 22

Explaining Russian manufacturing exports:

Firm characteristics and external conditions

Donato De Rosa

JEL Codes : D21, F14, L60, O50, P23, P28, P31, P33, P37, R12

Keywords : Export decision, export destination, institutions, regulatory capture, spillovers, agglomeration, Dutch disease, Russia.

Explaining Russian Manufacturing Exports: Firm Characteristics and External Conditions[*]

Donato De Rosa
PSE Paris-Jourdan Sciences Economiques
(Joint Research Unit CNRS-EHESS-ENS-ENPC)
donato@pse.ens.fr

Abstract

This paper examines the exporting behaviour of Russian manufacturers by considering the effects of firm characteristics and external conditions. Two measures of export behaviour are considered: the decision to export and the share of exports to developed markets. I find that specific exporting experience is the main determinant of both export status and destination. Contrary to studies for other countries, firm features, with the exception of firm size, are irrelevant for export status, while labour productivity is important in determining the intensity of exports to developed markets. There is also evidence that spillover effects from agglomeration have an effect on exporting. At the same time, a lower degree of regulatory capture and a less corrupt judiciary matter for orientation towards more developed markets, while regional resource dependence does not hinder manufacturing exporting.

JEL classification: D21, F14, L60, O50, P23, P28, P31, P33, P37, R12.
Keywords: export decision, export destination, institutions, regulatory capture, spillovers, agglomeration, Dutch disease, Russia.

[*] This work was carried out under the auspices of the RTN "Trade, Industrialization and Development." I would like to thank CEFIR, Moscow for kindly hosting me in a preliminary phase of this study, and, in particular, Evgeniya Bessonova, Konstantin Kozlov, Evgeniy Yakovlev and Ekaterina Zhuravskaya for kindly providing the data; Holger Görg of the University of Nottingham Leverhulme Centre for Research on Globalisation and Economic Policy, Irena Grosfeld, Daniel Cohen, Thierry Verdier, Gregory Corcos, Carine Milcent, Susanna Thede of PSE ; and Simson Unterberger.

Introduction

Russia's remarkable growth rates in recent years are widely believed to be heavily reliant on exports of natural resources. Yet, excessive dependence on the extractive sector can damage long term growth prospects, since its counterparts often are feeble development of manufacturing and scarce industrial exports. In this vein Isham et al. (2005) highlight the long term hazards connected with an export structure that is too concentrated on resource extraction. Their analysis of growth performance in 90 developing economies, between 1957 and 1997, reveals that countries whose export structure is dominated by "point source" exports –oil and minerals - are much more exposed to risks of slowdowns.

In the case of Russia, the share of natural resources in total exports has been steadily rising in recent years. For instance, OECD (2004) reports that, between 1997 and 2003, the share of oil has risen from 23% to 40% of the total, while, in the same period, the computed increase in revealed comparative advantage (RCA) for oil has exceeded 15%.[1] Much of the policy debate on Russia's future, thus, concerns the need for the Russian economy, including the composition of its exports, to diversify and become less reliant upon extractive industries.

This paper contributes to the debate by examining the decision to export, regardless of destination, and the share of exports to developed countries of Russian manufacturers. It is important to take into account the destination of shipments because exports to the CIS, a much more homogeneous market with respect to Russia itself, cannot be considered on the same level as exports to third, notably developed, countries. In fact, developed markets are more challenging both for the lack of commercial ties inherited from the past and for the higher quality and cost competitiveness demanded of Russian exporters.

Export decision and destination are examined by looking at factors that have been found to be significant in studies for other countries, namely firm characteristics and exporting experience. Attention is also devoted to elements that may be relevant in the specific case of Russia. The first such element is the possibility of spillovers from neighbouring exporters, which may be important since the spatial distribution of industry continues to be heavily shaped by decisions made by Soviet central planners, and exporters may tend to survive in less artificial industries and locations. The second element is the role that may be played by structural regional features, notably, the quality of the institutional environment, the consequences of resource dependence and the degree of business sector development.

Analysis will proceed in two steps. The first step will examine the role of firm characteristics, specific exporting experience and agglomeration effects on the decision to export in the period 1996-2001 and on the share of exports to developed countries in the period 1998-2001. Firm level data from the Goskomstat Russian Enterprise Register Longitudinal Database (RERLD) are matched with the Russian Customs Export database for the construction of export related variables. Variables representing agglomeration of manufacturing exporting are obtained from the matched database: regional-industrial export propensity is defined as the share of exporters in a region and sector, while regional–industrial export intensity is defined as the share of exports by value in regional-industrial output.

The second step will examine the role of institutional factors and other regional conditions, taking 2001 as a reference year. Institutional variables include the Slinko et al. (2005) index of regulatory capture and the Transparency International regional corruption index. Controls for other regional conditions are taken from the Yearbook of Russian regions and include an index of natural resource dependence, constructed as the share of extractive industries in Gross Regional Industrial Production, and the share of small enterprises per capita.

Results indicate that specific exporting experience and firm size are the main determinants of the decision to export, while labour productivity is important only for the intensity of exports to developed markets. Spillover effects deriving from the agglomeration of exporting activity also seem to matter, especially for

[1]Revealed comparative advantage (RCA) is an empirical indicator of trade specialization. Defining X_i and M_i as, respectively, exports and imports, RCA is computed, for each sector *i*, as:

$$RCA_i = \left(\frac{X_i}{\sum X_k} \frac{M_i}{\sum M_k} \right) \cdot 100$$

export destination. Among structural features, unfriendly regulation and a corrupt judiciary are found to be particularly harmful for firms that export a larger share of their production outside the CIS. Regional resource dependence *per se*, on the other hand, is inconsequential for manufacturing exporting, thus failing to provide evidence to diagnose "Dutch disease". A lesson to be drawn may be that resource dependence is harmful only insofar as it contributes to degenerate the quality of existing institutions.

This study is organized as follows. Initially, is a brief review of the literature treating the firm-level and environmental determinants of export behaviour. Next, hypotheses concerning the determinants of export performance are proposed. Following a description of available data, the next section investigates the consequences of firm-specific features, agglomeration effects and environmental conditions on two aspects of exporting performance: the decision to export and the share of exports to developed markets. A final section proposes some concluding comments.

1. Literature

1.1 Firm-level determinants of exporting and spillovers from neighbouring exporters

A primary determinant of a firm's decision to export is its productivity, which is connected with its ability to compete in international markets. The literature linking engagement in foreign markets and firm level productivity originated as empirical. Testable hypotheses were then formalized in theoretical models that aim to explain why certain firms successfully enter export markets and why they are more productive than their domestically orientated counterparts. The process by which some firms in a given population self-select into export markets is usually embedded in models of industry dynamics with sunk costs of entry, where heterogeneous firms are subject to random shocks to their productivity. Only certain firms are able to withstand these shocks and therefore enter or remain in the exporting sector, others exit.

Most of the empirical evidence indicates that exporters perform better than non exporters in terms of a wide range of indicators, such as productivity, size, wages paid, length of survival. In order to elucidate the positive correlation between exporting status and performance, the literature proposes two main explanations. One is the self-selection hypothesis, whereby firms which are engaged in foreign markets are more productive *prior* to exporting, and, therefore, self-select into export markets. If entry entails sunk costs, only more efficient firms will find it profitable to enter the export market in the first place. The learning-by-exporting hypothesis, on the other hand, maintains that exporting has a positive impact on firm performance, therefore exporting firms become more productive *subsequent* to their decision to enter international markets. Efficiency enhancements result from knowledge and expertise acquired as a direct consequence of exposure to competition in foreign markets. A number of empirical studies have been conducted for both developed and developing economies, and they are predominantly favourable to the self-selection hypothesis.

In the context of developed countries, Bernard and Jensen (1999), using manufacturing data for the United States, find robust evidence in favour of the self-selection hypothesis.[2] Bernard and Jensen (1999a) find that exporting is associated with a reallocation of inputs from less efficient to more efficient plants. The aggregation of plant level results indicates that this reallocation effect brings a significant contribution to total factor productivity growth in the manufacturing sector. Melitz (2003), while finding a rationale for a causal link between productivity and exporting, also proposes a theoretical argument for the relationship between openness, reallocation effects and aggregate productivity. A general equilibrium model is constructed incorporating heterogeneous productivity across firms. Entry into the export market is costly. As a consequence, firms with higher ex ante productivity self-select into the export market, while those with lower productivity are only active in the domestic market. Falling trade costs induce firm-level reallocations, through the expansion of more productive firms and the contraction or exit of their least productive counterparts. This process leads to an increase in aggregate productivity.

[2] Other studies on developed economies include Girma et al. (2003) for the United Kingdom and Greenaway et al. (2003) for Sweden.

As for the learning-by-exporting hypothesis, evidence in its favour is less compelling. Clerides et al. (1998) analyse manufacturing data for Colombia, Mexico and Morocco and find that a firm's exporting history has no significant impact on current production costs. This paper includes a theoretical model of a firm's decision to diversify in the export market. The entry decision is based on comparison between expected future profits, which depend on current and future productivity, and the sunk cost of entry. Learning-by-exporting is contemplated by having current productivity depend on prior export experience. Simulation results indicate that firms that enter or remain in the export market have higher productivity than firms that stop exporting or remain only in the domestic market. These findings imply that firms self-select into the export market, based on current productivity. Learning-by-exporting has the sole effect of widening the gap between exporting and non-exporting firms.

Kraay (1999) finds strong support for the learning-by-exporting hypothesis in a panel of Chinese enterprises. A possible explanation for this result is that he models experience differently than other authors: rather than export propensity, created as a dummy for export status in any given year, Kraay examines export intensity, constructed as share of exports over total sales. This suggests that positive learning effects on productivity may indeed be present when taking into account past export shares in firm turnover rather than past export status *per se*.

Aw et al. (2000), using firm level manufacturing data from the Republic of Korea and Taiwan (China), analyse the link between a producer's total factor productivity and the export decision. The focus is on the relationship between productivity and movements in or out of export markets. Interestingly, only in Taiwan entry and exit from export markets reflects systematic variations in productivity, while in Korea exporting experience plays an important role.

Spillovers from the exporting activity of firms operating in the same industry and region have also been considered in the literature as possible determinants of export orientation. Such location-specific spillovers could derive from the fact that geographical concentration of exporters may make it feasible to construct specialized transportation infrastructure or may improve access to information on the preferences of foreign customers.

Aitken et al. (1997) explicitly contemplate this possibility in the case of Mexican manufacturing and conclude that the only spillovers having an impact on a firm's exporting decision are those from multinational enterprises and not from general exporting activity. Clerides et al. (1998) and Bernard and Jensen (2004) also find weak support for regional and sectoral spillovers in the case of, respectively, Colombian and U.S. firms. Aw et al. (2000), find that vertical spillovers from subcontractors lower the sunk costs of entry into the export market in Taiwan, as opposed to Korea. Such spillovers may be a substitute for firm-specific export experience in determining international orientation. Barrios et al. (2003), examining a panel of Spanish firms, find that own R&D activity, a gauge of a better firm, is an important determinant of export activity. At the same time they also find a stronger marginal effect of intra-sectoral R&D spillovers on export intensity for firms that export to OECD countries, than for those that export to less developed countries.

1.2 The role of the environment

Structural features of the environment in which firms operate are likely to influence their behaviour and can, therefore, be interpreted as determinants of their propensity to export as well as of the destination of their shipments.

The first such element is the quality of surrounding institutions, which conditions the behaviour and the incentives of economic agents, including the international orientation of firms. In general, the risk of expropriation deriving from an arbitrary rule of law and weak protection of property rights is likely to diminish incentives for investment and innovation, which are prime sources of productivity enhancements and of the ability to compete in export markets. Poor institutional quality also implies other collateral effects. For instance, external finance, both equity and debt, will not be easily obtained because of the difficulty to enforce the underlying contracts. For the same reason, foreign investors will be cautious to

become engaged, thus leading to inferior knowledge of foreign markets and reduced access to a broader array of financial opportunities to fund investment and innovation.[3]

Acemoglu (2006) offers a general framework to analyze the emergence and persistence of inefficient institutions. He highlights the role of elites, defined as groups with the power to choose policies that allow them to extract rents from the rest of society. The consequence of this rent-seeking on the part of elites is the diversion of resources from productive activities and the distortion of incentives for both allocative and, thorough the discouragement of innovation, dynamic efficiency, with negative repercussions on long-run growth.

This approach generalizes and formalizes the idea of institutional subversion or state capture, whereby law making and enforcement institutions are subverted by special interests, who shape the content of laws, regulations and court decisions for their own benefit.[4] Institutional subversion may occur if some agents are endowed with lobbying power, perhaps deriving from the availability of large financial resources or an otherwise privileged status. Powerful groups may compete for political influence in order to influence the content of policies, as in the models described by Becker (1983) and by Grossman and Helpman (1994), or may attempt to subvert the judicial system, as in Glaeser et al. (2003), where the efficiency of the judiciary is inversely proportional to the degree of asymmetry in the power of the parties involved.

Referring to forms of interaction between firms and the state, World Bank (2000) and Hellman et al. (2003) make a distinction between "influence" and "capture". Influence is intrinsic to features of firms, such as their status of state-owned enterprise, state monopoly or to the fact that they operate in politically sensitive industries or regions. Capture, on the other hand, is a rational survival strategy on the part of successful new firms, who have bidding power vis-à-vis politicians and bureaucrats to effectively purchase the content of laws and regulations or their enforcement. The strategic goal of influencing or capturing the law making and enforcement process is to prevent the emergence of competition, while a more tactical goal would be to ensure that incumbents can fully benefit from the rents deriving from their position, for instance by receiving favourable tax treatment or subsidies from the budget.

The abundance of natural resources may exacerbate these institutional pathologies, as emphasized in several recent studies, which have established a connection between natural resource abundance, the quality of the institutional environment and long-run growth. The proposed mechanism implies that rents generated by natural resources lead to rapacious rent-seeking, which diverts resources from productive activities and, as a consequence, hampers long run economic performance.[5]

Resource dependence may also affect economic performance as in Dutch disease strand of theories, whereby the extractive sector causes factors of production to be drained away from manufacturing, thus impairing its potential productivity and ultimately ensuring the decline of the sector as a whole. Since manufacturing entails positive productivity spillovers, this has harmful repercussions on growth.[6] Furthermore, the volatility of resource prices on international markets, and the consequent fluctuations in the relative prices of resources and other exports, will also increase uncertainty in the domestic non-resource sector. Resource dependence also frequently entails real exchange rate appreciation, thus increasing competitive pressures on domestic exporters in other sectors, and affecting their ability to export. At the same time, the high value of the domestic currency will increase the purchasing power of domestic consumers in terms of foreign goods, thus further increasing the pressure on domestic manufacturers through the channel of import competition.

[3] This is the case in Russia, where international capital is mostly present in production for the domestic market and in fuel sectors. See Yudaeva et al. (2003).

[4] The shaping of institutions by special interests is known as state capture or institutional subversion and is an extension of the narrower notion of regulatory capture, whereby regulations are devised for the benefit of the regulated as a consequence of asymmetric information or collective action problems. The concept of regulatory capture was introduced in the seminal works by Stigler (1971) and Peltzman (1976). A comprehensive treatment is provided by Laffont and Tirole (1993).

[5] See Baland and Francois (2000), Leite and Weidmann (1999), Torvik (2002) for a theoretical framework. Isham et al. (2003), Mehlum et al (2002) and Sala-i-Martin and Subramanian (2003) perform cross-country empirical studies.

[6] Seminal models of Dutch Disease are proposed by Bruno and Sachs (1982) and Sachs and Warner (1995).

2. Hypotheses

In this section I state a number of predictions regarding the determinants of export decision and destination, which relate the general considerations of the previous section to the Russian case. A first set of hypotheses refers to the effects of specific exporting experience, firm characteristics and spillover effects. A second set considers structural features of the Russian environment, notably the quality of law making and enforcement institutions, the consequences of resource dependence and the degree of business sector development.

2.1. Experience, firm characteristics and agglomeration effects

Specific exporting experience influences the export decision and the destination of shipments.

The preliminary hypothesis to be verified is that in Russia, as in other economies for which studies have been conducted, specific exporting experience, in the form of sunk costs of entry and past export volumes, leads to persistence in exporting activity. Experience should be relevant in Russia since Russian firms are bound to have a significant presence in markets of the former Soviet space, as a legacy of commercial ties from the old order. Additionally, the CIS can be considered a fairly homogeneous economic space, thus further contributing to facilitating the penetration of Russian exporters, who can be expected to have a competitive advantage in those markets descending from their knowledge of local preferences and demand conditions.

Experience may, for opposite reasons, also be relevant for exports to developed countries, since sunk costs of entry and past export volumes may be crucial factors to be able to penetrate and maintain a foothold in less familiar markets, characterized by more intense competitive pressures and more demanding customers.

Firm characteristics influence the export decision and the destination of shipments.

An additional hypothesis to be tested is that in Russia, as in other countries, firm characteristics are an important determinant of export behaviour. In particular, larger and more productive firms should be more inclined to be present in international markets. Furthermore, better firms should be capable of exporting to developed, hence more competitive, markets. As emphasized in the previous hypothesis, export destination is likely to be particularly relevant for Russia: I expect exports to other CIS countries to be easier than exports to third, notably developed, countries, where firm characteristics, such as productivity, could be essential in markets that are more challenging in terms of quality and cost competitiveness of products.

The spatial distribution of industry inherited from Soviet central planning is likely to highlight the spillover effects of agglomeration. This may produce a significant influence on the export decision and the destination of shipments.

Local agglomeration effects are explicitly treated in World Bank (2004). It is reported that Russian industry is less locally concentrated than US industry and that agglomeration has been on the rise since 1992. Low initial agglomeration is interpreted as the effect of a strategic design by Soviet central planners, who intentionally distributed standard-sized production facilities across the vast space of the USSR, generating a distribution of industry, which, as outlined by Gaddy and Hill (2003), is likely to differ from the pattern that would have prevailed under market conditions.

Given the vast expanses of the Russian territory, as well as the distorted and dispersed location of production units, the consequences for Russian producers in terms of proximity to factors of production, subcontractors and destination markets might be relevant. In particular, more viable firms are likely to survive in locations and industries which were less artificially located to begin with. This implies that internationally competitive firms, especially if they are present in developed markets, are more likely to emerge in agglomerated regional and industrial clusters.

2.2. Institutional quality and other regional conditions

Better institutional conditions, namely lower institutional subversion or state capture, favour the emergence of internationally competitive manufacturers.

The main regional characteristic on which I focus my attention is institutional quality, notably capture or subversion of law making and enforcement by powerful firms. Institutional subversion is the consequence of the lobbying activity by powerful business interests, which has the effect of undermining a level playing field for all economic agents, since influential players attempt to receive privileged legislative treatment, access to scarce budgetary allocations, as well as favourable court rulings in commercial disputes with other firms. There is some evidence that this is the case in the Russian enterprise sector. For instance, Slinko et al. (2005) find tax breaks to be the most common form of preferential treatment received by influential firms, followed by subsidized loans from the budget and direct subsidies. Frye (2002), based on survey evidence of Russian firms, finds that court decisions are perceived as being easily manipulated by the state and, even more, by powerful businesses.

World Bank (2000) and Hellman et al. (2003) point out how firms operating in "high capture" environments, defined by the existence of a highly pervasive "market for capture", are forced to make considerable efforts to survive unfriendly regulation and a biased judiciary. Indeed, capture may even be a strategic option, especially for successful firms. The choice of capturing law making and enforcement institutions is, nonetheless, costly and may, notably, influence the variable cost of production and hence the expected profitability of exporting.[7]

Some empirical studies examine the wider implications of state capture. These include a series of works based on the two rounds of the Business Environment and Enterprise Performance Survey (BEEPS) conducted in 22 transition countries [8] and Slinko et al. (2005), who analyse the Russian case. These studies find that capture is associated with both substantial benefits for captor firms, and negative externalities for the wider economy, notably for other firms. For instance, Slinko et al. (2005) discover that capture impairs the performance of non-influential players, while negatively affecting small business growth, tax capacity of the state, and share of social public expenditure.

Admittedly, regional conditions other than the quality of the institutional environment may have an impact on the emergence of internationally competitive manufacturers. In order to take this possibility into account, two control hypotheses regarding regional conditions will also be considered: they address regional heterogeneity in resource dependence and in business sector development.

Resource dependence may hamper the emergence of internationally competitive manufacturers.

Natural resource rents may contribute to exacerbate state capture by offering both the financial means and the incentives for political pressure.[9] As a more general implication of resource abundance, symptoms of the related phenomenon of Dutch disease may be found in the lack of international competitiveness of the manufacturing sector. Manufacturers not only face the long term constraints imposed by the drainage of physical, financial and human capital towards the resource sector, but also have to overcome the more transitory difficulties imposed by the volatility and frequent real appreciation of the exchange rate.

Melitz (2003) provides a lens for contemplating a counter-hypothesis to the negative effects of resource dependence. He notes how increased competitive pressure from international trade stimulates intra-industry reallocation of market shares and factors of production. Exchange rate appreciation, which may be ignited by reliance on resource exports, inevitably intensifies competitive pressure on both export and domestic

[7] Appendix C proposes a model of the export decision in which structural features of the environment directly contribute to the variable cost of production. The expenses that have to be incurred to capture laws, regulations and court decisions are an example of how the institutional environment can weigh upon firms' costs.

[8] Studies based on the BEEPS survey include Hellman, Jones and Kaufmann (2003); Hellman, Jones, Kaufmann and Schankerman (2000); Hellman and Schankerman (2000); Hellman and Kaufmann (2003).

[9] See De Rosa (2006).

markets. Such an outcome may be interpreted as an increase in *effective* exposure to trade, notwithstanding the trade policies actually implemented and the intentions of policymakers. The result of such a process may not be the thwarting of manufacturing in its entirety, but, rather, the acceleration of the weeding out of less competitive firms, via the reallocation of market shares and profits to more efficient players. In the context of exporting, this might be apparent in the effective ranking of firms in the three categories of exporters to developed markets –the best firms-, exporters to the CIS, and non-exporters. Ahrend et al. (2006) compare Russian and Ukrainian industrial sectors, using Ukraine as a baseline counterfactual, and find evidence that higher wage levels in Russia have been accompanied by higher levels of labour productivity. This suggest that resource wealth may have forced Russia's manufacturing sector to be more productive in value creation and that the reallocation effects implied by Melitz (2003) may have been at work.[10] Indirect evidence in the same direction is also provided by Bessonova et al. (2003), who find a positive impact of import competition on the productivity of domestic firms.

Regional heterogeneity in business sector development may influence the emergence of internationally competitive manufacturers.

The effects of the diverse paths of reform followed by Russian regions may be evident in the heterogeneous development of the enterprise sector. A thriving small business sector reflects the vitality of the region in which a firm operates, for instance by fostering the emergence of linkages between exporters and regional suppliers, which may reduce firms' costs, thus ameliorating their international competitiveness. As pointed out by Aw et al. (2000) in the case of Taiwan, such vertical spillovers from subcontractors lower the sunk costs of entry into the export market acting as a substitute for firm-specific export experience.

A large small enterprise sector may also have a negative interpretation. Models of Dutch disease highlight the abnormal expansion of the non-traded sector - notably services, retail trade and construction – as a side-effect of resource dependence. This may contribute to the plight of manufacturing by accentuating resource drainage.[11] If this were the case, a large presence of small enterprises would not be a gauge of advanced regional development but of an employment of factors of production which is not functional to manufacturing activity.

3. Data[12]

The main firm-level dataset used in the analysis is the Goskomstat Russian Enterprise Register Longitudinal Database (RERLD).[13] This was matched with the Russian Customs Export database for the construction of the export-related variables. The focus of this study is manufacturing export. Since it is fairly common practice for Russian firms to engage in the exporting of natural resources, regardless of their field of activity, care was taken in excluding non-manufacturing transactions from the export database before matching it with the RERLD.[14] The RERLD was also enriched with a foreign ownership dummy obtained by matching the RERLD with the Register of Foreign-Owned Firms (RFOF).

[10] The domestic factor market is identified by Melitz (2003) as an important channel for the weeding out of less productive firms from export markets. In particular, the increased demand for labour caused by the expansion of more productive firms bids up the real wage, thus forcing their less productive counterparts, who cannot afford higher costs, to exit. Action by policymakers aimed at interfering with the flexibility of factor markets would hinder this beneficial reallocation process and, thus, prevent the economy from reaping the full benefits of increased aggregate productivity accruing from exposure to trade.

[11] Such an outcome would be caused by the windfall revenues from exports of natural resources being poured into non-traded activities. See Bruno and Sachs (1982) and Sachs and Warner (1995).

[12] See Appendix A for further details.

[13] The Goskomstat RERLD is likely to offer a poor representation of the new enterprise sector since newly created firms may have weak incentives to report to Goskomstat. Furthermore, since the census excludes, by design, all the firms that are more than 75% individually owned, it will omit a very large share of start-ups. Appendix B proposes a methodology for obtaining the definition of new firms employed in the remainder of this study.

[14] I would like to thank Konstantin Kozlov of CEFIR, Moscow for this insight, as well as for his irreplaceable assistance in cleaning and matching the two databases. The metallurgy sector includes both firms that are active in the extraction of raw materials and firms that are engaged in their processing. The transactions concerning the former were excluded from the database.

A general impression regarding the continuity of exporting activity can be obtained from Table 1 and it indicates that less than 20 % of Russian manufacturers had some involvement with exporting and that only approximately three percent were continuously present in foreign markets in the six years of the window of time available.

[Table 1 here]

A glance at Table 2 confirms that the basic characteristics of exporters in Russia, relative to non-exporters, are largely in line with what is observed in most countries. Exporters appear to be much larger, in terms of employment, more productive, more capital intensive and with a larger foreign presence. Continuous exporters are significantly larger, but not more productive, than both intermittent exporters and non-exporters.

[Table 2 here]

A dataset from the Customs of the Russian Federation contains details regarding the export transactions effected by Russian firms. A matching exercise with the Goskomstat census allows to link transactions to various destinations with the characteristics of the enterprises that performed them[15]. The last column of Table 2 shows that exporters to developed markets are the most productive and pay higher wages, while they are not more capital intensive and are not larger than other exporters. It is also noteworthy that a higher proportion of these firms than the average for exporters stems from the new private sector and is owned by foreign investors.

Table 3 confirms that, while the great majority of transactions to all destinations can be attributed to traditional enterprises, new firms seem to perform a larger share of transactions to more, rather than less, developed markets. Less than 20% of transactions to the CIS are effected by new firms, emphasizing the importance of established trade links with traditional markets. The share of new firms' transactions rises substantially to 28% when considering developed markets as a whole, and to over 30% for the EU15, the US and Canada.

[Table 3 here]

Table 4 reports the breakdown of export destinations to different regions. The largest share of transactions is directed to developed countries, and the portion pertaining to the CIS slightly declines between 1998 and 2001. This might be interpreted as evidence of some redirection of trade towards more developed markets due to the more favourable exchange rate conditions as the Rouble was devaluated in 1998. This effect appears to be fading out after 1999, possibly due to the fact that the exchange rate effect was rapidly eroded as the Rouble began to re-appreciate in real terms after 1999.[16] Furthermore, most Russian firms were able to exploit previously untapped domestic demand by expanding their market share in the domestic market, as imported intermediate and final goods became more expensive for domestic customers.

[Table 4 here]

Table 5 reports the evolution of agglomeration of manufacturing exporting across Russian regions. Two measures are considered. The first is export propensity, defined as the share of exporting firms present in the region and operating in a given industrial sector. The second is export intensity, constructed as the share of exports by value in regional-industrial output.

[Table 5 here]

[15] Data on the destination of transaction cover the period 1998-2001. For the sake of comparability of export destination with general exporting activity, Tables 2, 3 and 4 present averages for 1998-2001.

[16] Author's calculations, based on the International Financial Statistics database, indicate that at the end of the sample period, in 2001, the Rouble's real exchange rate had recovered 86% of its 1996 value, after bottoming out at 66% of the reference value in 1999. This provides evidence of rapid and sustained real exchange rate appreciation in the aftermath of the crisis.

The pattern for export propensity indicates that, while the share of exporting firms is declining, exporters are becoming more agglomerated in regional-industrial clusters, as indicated by the diminishing value of the standard deviation. At the same time, the evolution of export intensity indicates that, at least until 2000, the proportion of sales by value of regional industrial clusters that is exported shows a marked increase, with its dispersion across region-sectors also increasing.

Since each firm is identified according to its region of operation, it is also possible to associate each firm to regional characteristics. The regional variables considered include the Slinko et al. (2005) index of regulatory capture and the Transparency International regional corruption index, as well as two control variables for regional conditions taken from the Yearbook of Russian regions: an index of natural resource dependence, constructed as the share of extractive industries in Gross Regional Industrial Production, and the share of small enterprises per capita.

The regional detail of the institutional indicators is reported in Appendix D. The variable for regional regulatory capture was constructed by Slinko et al. (2005) for 73 Russian regions and is computed by considering regional laws enacted in the period 1995-2000 and found to contain preferential treatment for the five largest non-state firms and the larger State-owned enterprises on a regional basis. The second institutional variable considers regional corruption of law enforcement, and is constructed on the basis of a survey by Transparency International as an index reflecting entrepreneurs' perception of corruption in the judicial process.[17] Given the structure of the Russian judicial system, the evaluation is likely to refer to arbitration courts, the commercial courts that more directly affect the operation of enterprises. The survey was conducted in 2002. Nonetheless, since a similar variable for previous years is not available, the assessment on corruption of the judiciary is used as a proxy for the previous period average. Although, strictly speaking, this procedure is incorrect, it is realistic to assume that institutional variables are stable in the short run, and, therefore, posterior values can sensibly be used as proxies for previous years.

4. Empirical methodology and results

My empirical strategy consists in estimating two aspects of export behaviour: the decision to export and the share of exports to developed markets. Analysis will proceed in two steps. The first step will examine the role of firm characteristics, specific exporting experience and agglomeration effects.[18] The second step will focus on institutional factors and other regional conditions. Since institutional conditions, as well as other regional characteristics, are long-run phenomena that are best considered as period averages, analysis will be conducted in a static framework, taking 2001 as a reference year.

4.1 Firm characteristics, experience and agglomeration effects

4.1.1 The export decision

The export decision is modelled by replicating the approach of Bernard and Jensen (2001 and 2004). As shown in Appendix C, the firm's decision to export in period *t* is defined as the production of a non-negative export quantity q^*_{it} and is determined according to the following decision rule:

$$Y_{it}=1 \text{ if } \tilde{\pi}_{it} \geq 0$$
$$Y_{it}=0 \text{ if } \tilde{\pi}_{it} < 0 \qquad (1)$$

where π_{it} are profits from exporting and are defined as follows:

[17] This variable was kindly provided by Evgeniy Yakovlev of CEFIR, Moscow.
[18] The period of analysis is 1996-2001 in the case of the export decision and 1998-2001, due to data availability, in the case of the share of exports to developed markets.

$$\tilde{\pi}_{it} = \left[p_t \cdot q_{it}^* - c_{it}(\cdot) - \sigma\left(1 - Y_{it-1}\right)\right] + \delta E_t \left[W_{it+1}(\cdot) \middle| q_{it}^* > 0\right] - \delta E_t \left[W_{it+1}(\cdot) \middle| q_{it}^* = 0\right] \quad (2)$$

In other words, a firm will decide to export if the sum of present and expected future profits from exporting is non-negative. Profits in export markets depend on export revenues - with p_t being the exogenous international price for the firm's product and q^*_{it} the profit-maximizing export quantity – minus the cost connected with exporting. The latter is composed of the firm's variable cost of production and of the one-off sunk cost of entry into export markets. The variable cost of production, c_{it} - as detailed in Appendix C - is determined by elements that may vary across firms and over time, by time dependent variables, at well as by time invariant features of the environment. Sunk costs, σ, are assumed to be present if the firm did not export in the previous period. Given that the international export price is exogenous, profit will ultimately depend on the variable cost of production and on the sunk cost of entry.

In order to identify the factors that determine the probability of exporting, I will follow Bernard and Jensen (2004) in adopting a linear probability framework to estimate a binary non-structural model. This approach is chosen because of its computational simplicity and its versatility in allowing, as discussed below, the employment of GMM techniques that address the issue of estimation of the coefficient on the lagged dependent variable. The following model is estimated:

$$\begin{aligned} &Y_{it} = 1 \quad \text{if} \quad \beta X_{it-1} + \gamma Z_{it} + \delta A_i + \tau T_t - \sigma\left(1 - Y_{it-1}\right) + \varepsilon_{it} > 0 \\ &Y_{it} = 0 \quad \text{otherwise} \end{aligned} \quad (3)$$

The explained variable for export status, Y_{it}, is binary, taking a value of one if the firm exports in the reference period. The determinants of the variable cost of production, c_{it}, are included in X_{it-1} and Z_{it}. The vector X_{it-1} incorporates firm-specific characteristics, such as size, productivity, capital intensity, wage levels, foreign ownership, as well as the lagged share of exports in firm turnover, embodying past exporting experience. Z_{it} includes spillovers from the activity of neighbouring exporters. Time invariant characteristics, such as firm origin, as well as regional and industry fixed effects are included in A_i. The last the term, $\sigma(1-Y_{it-1})$, reflects the role of sunk costs of entry into export markets.

Firm characteristics in the vector X_{it-1} have been found in studies of several other countries to be different for exporters and non exporters, with the former generally appearing to be larger, more productive and paying higher wages.[19] These features are included as lagged logarithms. Firm size is embodied in the number of employees; labour productivity is calculated as sales per worker; capital intensity is represented by fixed capital per worker; while wage levels are computed as the total wage bill divided by the number of employees. A dummy for foreign ownership takes into account the possibility that a foreign investor may have acquired a share in the capital of the firm for re-exporting purposes.[20] Finally, specific exporting experience in the form of export intensity is constructed as the lagged share of exports in turnover. This reflects exporting know-how in the sense that familiarity with international markets depends not only on exporting status *per se* but, crucially, on export volumes.

The vector Z_{it} includes variables representing the possibility of spillovers deriving from the agglomeration of exporting activity. Replicating the classification of the possible sources of spillovers employed by Bernard and Jensen (2004), regional-industrial export propensity and intensity are considered in turn. Alternative measures of proximity to neighbouring exporters are also considered. They reflect the propensity or intensity of exporting of the firm's sector outside the firm's region, and in the firm's region excluding the firm's sector.

[19] See, for example, Bernard and Jensen (1999, 1999a, 2001 and 2004) for the United States, Bernard and Wagner (1997 and 2001) for Germany, Girma et al. (2003) for the United Kingdom, Greenaway et al. (2003) for Sweden, Clerides et al. (1998) for Colombia, Mexico and Morocco.

[20] Inclusion of the foreign ownership dummy will shorten the time period of estimation (1997-2000) relative to the data on exporting activity (1996-2001). Kozlov and Manaenkov (2002) and Yudaeva et al. (2003) examine the effects of foreign ownership in the Russian context.

The vector A_i stands for a number of exogenous firm-specific characteristics that are stable in the short run, such as the firm's region and sector of operation. Dummies for the region where a firm operates control for the geographic, economic and political conditions of a particular region. Industry dummies are intended to reflect the comparative advantage that is associated with particular industries. [21] The vector A_i also includes a binary variable that identifies the firm as new[22] or old, as a direct control for the legacies of central planning, in the sense that new firms are less likely to have inherited commercial ties with the CIS and may therefore be less prone to export when considering the export decision as such, that is not distinguishing according to export destination. The vector T_t includes year dummies, as a proxy for exogenous time-dependent market-level variables, such as global shocks that affect all regions indiscriminately, short run fluctuations in the exchange rate, and demand conditions for the firm's product.

The term $\sigma(1-Y_{it-1})$ reflects the one-off sunk cost of entry into export markets and is obtained by including a dummy for lagged export status. As in Dixit (1989), sunk costs represent the direct monetary expenses incurred at the time of entry in a new market and may be ascribed to the establishment of a distribution network or to marketing and advertising costs. The joint significance of lagged export status and lagged export intensity –the other variable reflecting export experience included in X_{it-1} - will be tested in each regression.

The most intricate methodological question concerns the identification of the parameter on the lagged value of the dependent variable, namely lagged export status. The panel structure of the data would warrant the use of fixed or random effects techniques, which would allow obtaining insights from having observations repeated over time for the same unit. Both techniques have some shortcomings. A random effects specification would confront the difficulty of requiring unobserved effects not only to have a random structure but to be uncorrelated with explanatory variables included in the model. This assumption is hardly tenable in the context of exporting activity, since, as discussed in Bernard and Jensen (2004), included firm features are likely to be correlated with such unobserved variables as the production technology available in each particular firm or managerial ability[23]. Fixed effects estimation, on its part, also involves some drawbacks for our purposes. Notably, most fixed effects specifications produce biased and inconsistent estimates for coefficients on lagged dependent variables, which would hinder the estimation of sunk costs.[24]

In order to overcome this problem, equation (3) will be estimated by employing a GMM approach. As in Bernard and Jensen (2004), one option is to consider the Arellano and Bond (1991) methodology with first differencing of variables, where lagged levels of the variables are valid instruments for the first differenced equation, provided that there is no second order serial correlation in the residuals. Another option is provided by the Blundell and Bond (1998) system GMM method, which combines a set of equations in first-differences, instrumented with lagged levels, and a set of equation in levels, instrumented with lagged differences. Given the relatively short time dimension of the data (1996-2001), difference GMM will imply the loss of many observations, but it is nonetheless useful to examine its results in order to directly address the issue of sunk costs. System GMM, on the other hand, addresses another drawback of the model in first differences, allowing to estimate time invariant characteristics, such as the status of new firm. Furthermore, first differencing leads to poor estimates if the series are highly persistent, thus providing an additional reason to prefer system GMM.

The GMM specifications will be compared to a simple pooled OLS estimation that ignores firm specific effects, and to a fixed effects formulation. As discussed in Bond (2002), OLS estimation, given its upward bias, will provide an upper bound for the coefficient on the lagged dependent variable, while fixed effects, which is downward biased, will provide a lower bound. A heuristic criterion to judge the validity of the GMM estimates will thus be provided by considering whether the estimated coefficient lies between the two extremes.

[21] Chapter 2 on Industrial Competitiveness in OECD (2004) contains a detailed breakdown of the revealed comparative advantage computed for various industrial sectors.

[22] See Appendix B for an account of the methodology used to define a firm as "new". This variable will be dropped from estimation in some specifications.

[23] Hausman tests soundly reject a random effects specification, pointing to correlation between unobserved firm effects and other explanatory variables.

[24] See Bernard and Jensen (2004) and references therein for a discussion of the drawbacks of different estimation methods in the context of exporting.

Results

As previously discussed, specific exporting experience, in the form of sunk costs of entry and past export volumes, may lead to persistence in exporting activity, especially in the context of Russia, where significant presence in the CIS may have been inherited from Soviet times. Firm Characteristics were hypothesized to influence the export decision, with larger and more productive firms being more inclined to be present in international markets. The dispersed distribution of industry inherited from Soviet central planning, on its part, was assumed to be a relevant influence on export performance by highlighting the spillover effects of agglomeration, with viable firms, including exporters, more likely to survive in locations and industries which were less artificially located to begin with.

Table 6 reports the results of the effects of experience, firm characteristics and agglomeration effects, with panel A showing spillovers form export propensity and panel B showing spillovers from export intensity of neighbouring firms. Columns (1) to (4) of Tables 6A and 6B present the results of different estimation methods: pooled OLS, fixed effects, GMM in first differences and system GMM. Columns (5) and (6) report results with the inclusion of a dummy for foreign ownership as an additional explanatory variable.[25]

[Table 6A here]

[Table 6B here]

As previously discussed, pooled OLS and fixed effects yield inconsistent estimates of lagged export status, with the former producing an upward biased estimate and the latter generating a downward biased estimate of the coefficient value. On the other hand, consistent estimates may be obtained from difference and system GMM. As expected, both specifications generate a parameter value lying between the two extremes of the OLS and the fixed effect models. It may be concluded that sunk costs of entry into export markets, as represented by lagged export status, have a significant impact on the probability of exporting, suggesting a fairly high persistence in exporting behaviour, with having exported in the previous period increasing the probability of exporting by over 20%. Past export shares, the supplementary measure of firm-specific experience, on the other hand, are not significant in the GMM specifications of columns (3) and (4).

Regarding firm characteristics, when accounting for firms' unobserved heterogeneity in the consistent GMM specifications, only firm size is always significant. This result contrasts with the findings of studies for other countries. It may provide a first indication that, in the case of Russia, inherited commercial ties, as represented by the significance of lagged export status, are more important than firm-level features in determining international orientation. Even the relevance of the parameter on size is more readily interpreted as continuing lack of restructuring in exporting manufacturers, than as an *ex post* gauge of a firm's success. That the coefficient on the condition of new firm is insignificant in the consistent system GMM specification indicates that traditional firms, who are more likely to be present in CIS markets, are the most probable exporters.

Spillovers form export intensity of neighbouring exporters (Table 6B) are only significant in the difference GMM specification. On the other hand, the large marginal effect in all specification of regional-industrial spillovers from export propensity (Table 6A) suggests that agglomeration effects may indeed be important in determining the export status of firms located in regional-industrial clusters, albeit, in the system GMM specification, the result is only significant at the 10% level. These outcomes seem to contrast with the findings of Bernard and Jensen (2004) for the United States, of Aitken et al (1997) for Mexico, and of Clerides et al. (1998) for Colombia and Morocco, who find no evidence of spillovers from neighbouring exporters.

[25] Data on foreign ownership cover the period 1997-2000. Given the short time span it was not possible to estimate this model with a GMM methodology. Pooled OLS and fixed effects results are presented for comparison.

4.1.2 Export to developed countries

Supplementary insights may be provided by consideration of the determinants of the destination of Russian exports. Indeed, taking into account the share of exports to developed countries, instead of the export decision *per se*, may produce results that are more in line with the evidence for other countries, that is the self-selection of better firms into export markets may become apparent. This is due to the fact that the determinants of exporting may be different for exports to developed countries and the CIS, since markets in developed countries can be expected to be more challenging in terms of higher quality and cost competitiveness of products. These characteristics are likely to be associated with more efficient firms, as well as with an incentive structure, both within the firm and in its environment, which rewards innovation and efficiency.

The equation for the share of export to developed countries is

$$Y_{it}^{D} = \beta X_{it-1} + \gamma Z_{it} + \delta A_i + \tau T_t - \sigma(1 - Y_{it-1}) + \varepsilon_{it} \qquad (4)$$

The dependent variable, Y^{D}_{it}, represents the share of exports to developed markets by value in firm total exports. The vector X_{it-1} includes firm-specific characteristics, such as size, productivity, capital intensity, wage levels and foreign ownership, as well as lagged export shares to developed countries, representing specific experience in these markets. Z_{it} includes spillovers from the activity of neighbouring exporters. A_i includes time invariant characteristics such as regional and industry fixed effects and firm origin, which may now be relevant since new exporting firms may have a larger share of exports to developed markets. Finally, the term $\sigma(1-Y_{it-1})$ reflects one off sunk costs of entry into export markets, with Y_{it-1} being a vector of dummies with a value of one if the firm was an exporter in the previous period.

In order to control for the sample selection bias that may be connected with exports to developed countries, estimation will be based on Heckman's (1979) two-step procedure. This takes into account the double selection mechanism underlying the orientation of exports to different destinations: a decision is made whether to enter the export market, and, only if this hurdle is passed, the share of exports to developed countries may be observed. Such an approach avoids the estimation bias that would result from the fact that the self-selected sample of exporters to developed countries is not representative of the population of exporters.

Given the short time period (1998-2001) for the data on exports to developed countries, it will not be possible to apply the GMM methodology in this context. Thus, interpretation of the coefficient on the lagged share of exports to developed countries will have to rely on the heuristic consideration of it being an upward bound, since, both in the pooled OLS and in the pooled Heckman (1979) specification, estimation will rely on an OLS model.

Results

Table 7 reports the results of the effects of experience, firm characteristics and agglomeration effects on the share of exports to developed markets, with panel A including spillovers form export propensity and panel B including spillovers from export intensity. Columns (1) to (3) present the results obtained from different estimation methods: pooled OLS in levels, fixed effects and a pooled Heckman selection model. Columns (4) to (6) report results from the same estimation methods with the inclusion of a dummy for foreign ownership as an additional explanatory variable.

[Table 7A here]

[Table 7B here]

The coefficients on firm specific experience indicate that there is a high persistence of exporting to more developed markets. This is especially true for lagged export share, which would confirm that firms face important initial barriers to entry into more advanced markets.

Among firm level characteristics, not only firm size but, in contrast with the export decision *per se*, also labour productivity has an impact on the proportion of export to developed markets. The positive effect of labour productivity confirms the expectation that only more productive firms are able to compete in more advanced markets. This may also provide *prima facie* evidence of the emergence of more competitive players, notably in more demanding export markets, in a process of intra-industry reallocation of market shares, of the type proposed by Melitz (2003). The wage variable is insignificant in determining a higher share of exports to developed countries, implying that exporters to developed markets do not bear the burden of a wage premium over exporters in general and non-exporters. The capital intensity variable is also insignificant, suggesting that the capital stock employed is still largely obsolete across the board, even for firms that export to developed markets.

That labour productivity and size are the only relevant firm level characteristics in determining export shares to developed markets, and that positive effects of wages and capital intensity fail to be detected, implies that the competitive advantage of Russian exporters to developed markets relies mainly on a cost structure that is managing to keep its wage component under control, notwithstanding the appreciation of the real exchange rate.[26] The status of new firm presents a consistently positive association with exports to developed markets, as does the presence of foreign owners. This would indicate that new and foreign owned firms that are export oriented tend to have a larger proportion of their shipments directed to developed markets.

Both regional-industrial export propensity and regional-industrial export intensity have a large effect on a firm's ability to direct a larger share of its shipments to developed markets. Better exporters would indeed seem to be clustered in specific regions and industries. As mentioned, this result may be interpreted in light of the fact that Russian industry in general is still far less geographically concentrated than it would if its spatial distribution had been determined solely by market forces. Notwithstanding the generally low agglomeration of industry, clustering of the best exporters could well be an early reflection of the fact that market mechanisms are beginning to overcome the irrational location decision made by central planners. In particular, geographical concentration of exporters may make it feasible to access specialized transportation infrastructure or information on the preferences of foreign customers, thus facilitating penetration of foreign markets.

4.2 Institutional quality and other regional conditions

It can be hypothesized that the structural characteristics of the region in which firms are located enter directly in their cost function, since the variable cost of production, as detailed in Appendix C, is also determined by time invariant features of the environment. Institutional and other regional conditions may thus affect the expected profits, and hence the probability, of exporting, as well as the intensity of exports to more developed markets.

Since regional conditions are best interpreted as long run phenomena, analysis of their influence on export status and orientation is carried out taking 2001 as the reference year and using the averages of past years for all explanatory variables.

Adapting equation (3) to a one-period framework, and extending it to include institutional and other regional variables, the export decision in 2001 will be determined according to the following binary choice model

$$Y_i = 1 \quad \text{if} \quad \beta X_{iT} + \gamma N_i + \delta I_{iT} + \lambda E_{iT} - \sigma\left(1 - Y_{i2000}\right) + \varepsilon_i > 0 \qquad (5)$$

$$Y_i = 0 \quad \text{otherwise}$$

[26] This might signify that the factor market as such has not yet emerged as channel for the weeding out of less productive firms, as implied by Melitz (2003), with the increased demand for labour caused by the expansion of more productive firms, exporters to developed markets in this case, forcing less efficient firms to exit.

The share of exports to developed countries in 2001, with the addition of regional conditions, is modified as follows, relative to equation (4):

$$Y_i^D = \beta X_{iT} + \gamma N_i + \delta I_{iT} + \lambda E_{iT} - \sigma(1 - Y_{i2000}) + \varepsilon_i \quad (6)$$

In equations (5) and (6) X_{iT} includes averages for the previous period of firm level characteristics, such as size, labour productivity, capital intensity, average wage and past export intensity, which is constructed as 1996-2000 average exports in turnover in the case of (5) and 1998-2001 average share of exports to developed countries in total exports in (6). N_i is a dummy that takes a value of one if the firm belongs to the new private sector and zero otherwise. The term $\sigma(1\text{-}Y_{i2000})$ represents the one-off costs of entry into export markets and is a dummy with a value of one if the firm exported in the previous period. I_{iT} is a vector of institutional variables, while E_{iT} controls for other regional conditions.

The vector I_{iT} is intended to reflect how propitious the institutional climate is for economic activity and, in particular, for the promotion of efficient exporters. It includes the Slinko et al. (2005) regional index of regulatory capture for the period 1995-2000 and the Transparency International index of corruption of the judiciary.

The vector E_{iT} contains controls for other, non-institutional, regional conditions. The first control is constructed as the 1995-2000 average incidence of extractive industries – oil, gas and mining – in gross regional industrial production (GRIP). The second control for regional conditions reflects the degree of business development and is constructed as the 1995-2000 average ratio of small enterprises over regional population.

Table 8 indicates that the effects of experience and firm characteristics are broadly in line with those previously obtained: experience plays an important role for both export status and destination, and firms with larger shares of exports to developed markets are more productive.

[Table 8 here]

Turning to institutional variables, a firm's export decision *per se* is only affected by corruption of the judiciary with a significance level of 10%, while the degree of regulatory capture has no effect. This implies that the subversion of regional institutions does not have a great impact on exporting when considering export status as such, that is not distinguishing between exports to the CIS and exports to more developed countries. It was argued that exporting to the CIS is less challenging for Russian firms, given their familiarity with local demand conditions and the possible presence of commercial ties inherited from the past. This suggest that cost effectiveness, insofar as it is affected by unfriendly regional institutions, is not the most crucial factor for competing in CIS markets.

The results concerning export orientation present a markedly different picture. Both corruption of the judicial process and regulatory capture have a significant impact on the share of exports to developed countries, even when accounting for regional and industrial fixed effects in the selection model presented in column (3). World Bank (2000) argues that the most successful firms, especially from the new private sector, have an active role in capturing state institutions, since attempting to influence the content of laws, regulations and judicial decisions is a rational survival strategy in high capture environments. The expenses connected with such lobbying activity enter directly in the cost function of firms and directly affect the profitability of exporting. Thus, the significantly negative effects of regulatory capture and judicial corruption on the intensity of exports to developed markets confirm that the costs of operating in a high capture environment are a relevant burden on the international competitiveness of the best firms.

Among other regional economic conditions, high resource dependence displays the expected negative sign only for the decision to export *per se*. Nonetheless, the economic magnitude of this effect on the probability of export participation is virtually nil and is statistically significant only at the 10% level. The share of exports to developed countries, on the other hand, is totally unaffected by a large regional incidence of extractive industries. This indicates that regional resource dependence does not hamper the emergence of export oriented manufacturers.

Small business development is also insignificant, indicating that no conclusions may be drawn as to whether a large presence of small businesses is of the vicious kind implied by the Dutch disease story of an abnormally large non-traded sector, or of the virtuous variety implied by the existence of a network of subcontractors for exporters.

Conclusions

Much of the policy debate in recent years has hinged upon the vital need for the Russian economy, particularly its export structure, to diversify away from natural resource dependence. An upshot of diversification should be the creation of a thriving manufacturing sector, able to compete in international markets. This paper tried to disentangle the factors that influence manufacturing exporting, assessing the relevance of firm level variables, spillover effects and structural features of the environment, for both the decision to export and orientation towards developed markets.

Enterprise-level analysis suggests that specific exporting experience is the main factor influencing international orientation, while firm-level characteristics - with the exception of firm size, and labour productivity in the case of export to developed markets - are less relevant. At the same time, the Soviet legacy in terms of dispersed location of industry still seems relevant for firm performance, since, contrary to the evidence for other countries, manufacturers who are competitive in developed markets have emerged in regional-industrial clusters.

Institutional pathologies, notably the subversion of law making and enforcement in courts, are important obstacles to the emergence of internationally competitive firms: while their effects seem inconsequential for the export decision itself, their relevance for the destination of Russian manufacturing shipments is substantial. Dependence of the Russian economy on natural resources, on the other hand, has a negligible impact on the emergence manufacturing exporters, implying that resource-driven growth is not incompatible with a competitive manufacturing sector. Combining this result with the negative impact of regulatory capture and a corrupt judiciary, it may be argued that resource dependence is harmful only insofar as it contributes to degenerate the quality of existing institutions. It may even be conjectured that the increased effective exposure to trade, which goes with the exchange rate appreciation related to resource dependence, may be a driving force in the shaping of a fit and competitive manufacturing sector, with an emerging distribution of firms along a spectrum going from the most productive, those with larger exports to developed countries, through those who export predominantly to the CIS, to non-exporters.

References

Acemoglu, Daron. 2006. "Modeling Inefficient Institutions." *NBER Working Paper No. 11940*.

Ahrend, Rudiger, Donato De Rosa and William Tompson. 2006. "Does Russia Suffer from 'Dutch Disease': A Comparison of Russia's and Ukraine's Industrial Sectors." *OECD Economics Department Working Paper,* forthcoming.

Aitken, Brian, Gordon Hanson and Ann Harrison. 1997. "Spillovers, Foreign Investment, and Export Behaviour." *Journal of International Economics*, 43(1-2), 103-132.

Arellano, Manuel, and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*, 58, 277-297.

Aw Bee Y., Sukkyun Chung and Marc J. Roberts. 2000. "Productivity and Turnover in the Export Market: Micro-Level Evidence from the Republic of Korea and Taiwan (China)." *The World Bank Economic Review* 14(1), 65-90.

Baland, Jean-Marie, and Patrick Francois. 2000. "Rent-Seeking and Resource Booms." *Journal of Development Economics*, 61, pp. 527-42.

Barrios, Salvador, Holger Görg and Eric Strobl. 2003. "Explaining Firms' Export Behaviour: R&D, Spillovers and the Destination Market." *Oxford Bulletin of Economic and Statistics*, 65, 4, pp. 475-96.

Becker, Gary S. 1983. "A Theory of Competition among Pressure Groups for Political Influence." *Quarterly Journal of Economics*, 98, 3, pp. 371-400.

Bernard Andrew B. and J. Bradford Jensen. 1999. "Exceptional Exporter Performance: Cause, Effect, or Both." *Journal of International Economics* 47, 1-25.

Bernard Andrew B. and J. Bradford Jensen. 1999a. "Exporting and Productivity." *NBER Working Paper No. 7135*.

Bernard, Andrew B. and J. Bradford Jensen. 2001. "Why Some Firms Export." *NBER Working Paper* No. 8349.

Bernard, Andrew B. and J. Bradford Jensen. 2004. "Why Some Firms Export." *The Review of Economics and Statistics*, 86, 2, pp. 561-569.

Bernard, Andrew B. and Joachim Wagner. 1997. "Exports and Success in German Manufacturing." *Weltwirtschaftliches Archiv*, 133, pp. 134-157.

Bernard, Andrew B. and Joachim Wagner. 2001. "Export Entry and Exit by German Firms." *Weltwirtschaftliches Archiv*, 137, pp. 105-123.

Bessonova, Evguenia, Konstantin Kozlov and Ksenia Yudaeva. 2003. "Trade Liberalization, Foreign Direct Investment, and Productivity of Russian Firms." CEFIR, Moscow.

Blundell, Richard, and Stephen Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics*, 87, 115-143.

Bond, Stephen. 2002. "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice." *The Institute for Fiscal Studies, Department of Economics, UCL, cemmap Working Paper CWP09/02*.

Brown Annette N. and J. David Brown. 1999. "The Transition of Market Structure in Russia: Economic Lessons and Implications for Competition." *SITE Staff Paper No.99/01*.

Bruno, Michael and Jeffrey Sachs. 1982. "Energy and Resource Allocation: A Dynamic Model of the 'Dutch Disease.'" *Review of Economic Studies*, 49, 5, pp. 845-59.

Clerides Sofronis K., Saul Lach and James R. Tybout. 1998. "Is 'Learning-by-Exporting' Important? Micro-Dynamics Evidence from Colombia, Mexico and Morocco." *Quarterly Journal of Economics* 113, 903-47.

De Rosa, Donato. 2006. "Natural Resources and Institutional Subversion: Evidence from Russia." Mimeo, PSE, Paris.

Dixit, Avinash. 1989. "Entry and Exit Decisions Under Uncertainty." *Journal of Political Economy*, 97, 3, pp. 620-38.

Frye, Timothy. 2002. "The Two Faces of Russian Courts: Evidence from a Survey of Company Managers" *East European Constitutional Review*, Winter/Spring, pp. 125-29.

Gaddy, Clifford G. and Fiona Hill. 2003. *Siberian Curse: How Communist Planners Left Russia Out in the Cold*. Washington DC: The Brookings Institution.

Girma Sourafel, David Greenaway, and Richard Kneller. 2003 "Entry to Export Markets and Productivity: A Microeconometric Analysis of Matched Firms." Forthcoming *Review of International Economics*.

Glaeser, Edward, Jose Scheinkman, and Andrei Shleifer. 2003. "The Injustice of Inequality." *Journal of Monetary Economics: Carnegie Rochester Series on Public Policy*, 114, 1, pp. 83-116.

Greenaway David, Joakim Gullstrand, and Richard Kneller. 2003. "Exporting May not always Boost Firm level productivity." *Leverhulme Centre Research Paper No.2003/26*.

Grossman, Gene, and Elhanan Helpman. 1994. "Protection for Sale" *American Economic Review* 84, 4, pp. 833-50.

Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47, 1, 153-161.

Hellman, Joel S., Geraint Jones, and Daniel Kaufmann. 2003. "Seize the State, Seize the Day: State Capture, Corruption and Influence in Transition" *Journal of Comparative Economics*, 31, 4, pp. 751-773.

Hellman, Joel S., Geraint Jones, Daniel Kaufmann, and Mark Schankerman. 2000. "Measuring Governance, Corruption, and State Capture in Transition Economies." *World Bank Policy Research Working Paper* No. 2312.

Hellman, Joel S., and Daniel Kaufmann. 2003. "The Inequality of Influence" *mimeo, The World Bank.*

Hellman, Joel S., and Mark Schankerman. 2000. "Intervention, Corruption and Capture" *Economics of Transition*, 8, 3, pp. 545-76.

Isham, Jonathan, Michael Woolcock, Lant Pritchett and Gwen Busby. 2005. "The Varieties of Resource Experience: How Natural Resource Export Structures Affect the Political Economy of Economic Growth." *World Bank Economic Review*, 19, 2, pp. 141-174.

Kozlov, Konstantin and Daniil Manaenkov. 2002. "Firms with Foreign Participation and their Influence on Export Activity in Russia." CEFIR, Moscow.

Kraay Aart. 1999. "Exports and Economic Performance: Evidence from a Panel of Chinese Enterprises." World Bank, Mimeo. Published as "Exportations et Performances Economiques: Etude d'un Panel d'Entreprises Chinoises." *Revue d'Economie du Développement* 1-2 (1999), 183-207.

Laffont, Jean-Jacques and Jean Tirole. 1993. *A Theory of Incentives in Procurement and Regulation*. Cambridge: The MIT Press.

Leite, Carlos, and Jens Weidmann. 1999. "Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth." IMF Working Paper WP/99/85.

Mehlum, Halvor, Karl Moene and Ragnar Torvik. 2002. "Institutions and the Resource Course." mimeo.

Melitz, Marc J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica* 71, 6, 1695-1725.

OECD. 2004. *OECD Economic Surveys: Russian Federation Volume 2004 Issue 11*. OECD, Paris.

Peltzman, Sam. 1976. "Toward a More General Theory of Regulation." *Journal of Law and Economics*, 19, pp. 211-40.

Roberts, Mark J. and James R. Tybout. 1997. "The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs." *The American Economic Review*, 87, 4, pp. 545-64.

Sachs, Jeffrey D. and Andrew M. Warner. 1995. "Natural Resource Abundance and Economic Growth." National Bureau of Economic Research Working Paper No. 5398.

Sala-i-Martin, Xavier, and Arvind Subramanian. 2003. "Addressing the Natural Resource Curse: An Illustration from Nigeria." National Bureau of Economic Research Working Paper No. 9804.

Slinko, Irina, Evgeny Yakovlev and Ekaterina Zhuravskaya. 2005. "Laws for Sale: Evidence from Russia." *American Law and Economics Review*, 7, 1, pp. 284-318.

Stigler, George. 1971. "The Theory of Economic Regulation." *Bell Journal of Economics and Management Science*, 2, pp. 3-21.

Torvik, Ragnar. 2002. "Natural Resources, Rent Seeking and Welfare." *Journal of Development Economics*, 67, pp. 455-70.

World Bank. 2000. *Anticorruption in transition: A contribution to the policy debate*. World Bank, Washington DC.

World Bank. 2004. *From Transition to Development: A Country Economic Memorandum of the Russian Federation*. World Bank, Moscow.

Yudaeva, Ksenia, Konstantin Kozlov, Natalia Melentieva and Natalia Ponomareva. 2003. "Does Foreign Ownership Matter? Russian Experience." *Economics of Transition*, 11, 3, pp. 383-409.

Table 1: Years of exporting experience in 1996-2001

Years	*Number of firms*	*Percentage*
0	41536	81.2
1	3528	6.9
2	1888	3.69
3	1188	2.32
4	840	1.64
5	602	1.18
6	1569	3.07
TOTAL	51151	100

Table 2 : Basic Characteristics of Manufacturing Exporters and non-Exporters (1998-2001 average)

	Non-exporters	*Exporters*	*Continuous Exporters*	*Exporters to developed countries*
Employment	179	1141	1746	1033
Labour productivity index	100	198	190	230
Capital intensity index	100	112	105	102
Average wage index	100	139	147	144
New firms (% of total)	41	30	8	36
Firms with foreign presence (% of total)	3	11	11	16

Table 3: Share of transactions originating from new firms (1998-2001 averages)

	% of total transactions
CIS	19.6
OECD and other developed countries	27.7
EU25	26.6
EU15	31.4
United States and Canada	32.2
Latin America	15.7
East and South Asia	25.1

Table 4: Destination of Russian manufacturing exports (share of total transactions, %)

	CIS	*OECD and other developed countries*	*EU25*	*EU15*	*United States and Canada*	*Latin America*	*East and South Asia*
1998	38.5	48.1	41.1	23.3	2.5	1.2	4.4
1999	33.9	51.6	43.9	25.3	3.2	1.7	5.2
2000	34.5	48.8	41.0	22.5	3.0	2.1	5.2
2001	36.2	46.1	39.2	22.4	2.6	2.3	4.9

Table 5: Agglomeration of Exporting

	Regional-industrial export propensity		*Regional-industrial export intensity*	
	mean	standard deviation	mean	standard deviation
1996	0.206	0.167	0.065	0.113
1997	0.174	0.149	0.070	0.131
1998	0.158	0.142	0.081	0.154
1999	0.156	0.143	0.095	0.170
2000	0.159	0.149	0.083	0.160
2001	0.155	0.148	0.066	0.135

Table 6A: Export Decision - Spillovers from export propensity

Linear probability model results: Alternative estimation methods

DEPENDENT VARIABLE: Export Status	*Pooled OLS*	*Fixed Effects*	*GMM First Differences*	*System GMM*	*Pooled OLS*	*Fixed Effects*
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged export status	0.533***	-0.025***	0.212***	0.243***	0.523***	-0.089***
	[0.006]	[0.007]	[0.040]	[0.028]	[0.006]	[0.007]
Lagged export intensity (export share of turnover)	0.350***	0.198***	0.136	-0.453	0.355***	0.184***
	[0.014]	[0.026]	[0.885]	[0.498]	[0.015]	[0.028]
New firm	0.022***			0.063	0.024***	
	[0.002]			[0.198]	[0.002]	
Foreign ownership dummy					0.049***	-0.002
					[0.009]	[0.019]
Lagged log employment	0.042***	0.055***	0.624**	0.281*	0.044***	0.057***
	[0.001]	[0.005]	[0.243]	[0.154]	[0.001]	[0.006]
Lagged log labour productivity	0.017***	0.011***	0.470	0.312*	0.017***	0.011***
	[0.001]	[0.002]	[0.480]	[0.186]	[0.001]	[0.002]
Lagged log fixed capital per worker	0.000	0.012***	-0.752	-0.278	-0.001	0.010***
	[0.001]	[0.003]	[0.463]	[0.170]	[0.001]	[0.004]
Lagged log average wage	-0.001	0.004	-1.039	-0.573*	-0.002	0.007***
	[0.002]	[0.003]	[0.633]	[0.302]	[0.002]	[0.003]
Regional-industrial export propensity	0.394***	0.909***	0.966***	0.446*	0.392***	0.909***
(% exporters over total firms)	[0.013]	[0.034]	[0.080]	[0.257]	[0.014]	[0.038]
Sectoral export propensity (outside the region)	-0.092	-0.250***	-0.335	-0.441**	-0.084	-0.195*
	[0.087]	[0.096]	[0.301]	[0.196]	[0.091]	[0.100]
Regional export propensity (outside sector)	0.356***	-0.002	0.219	-0.151	0.377***	0.000
	[0.060]	[0.064]	[0.184]	[0.427]	[0.070]	[0.074]
Constant	-0.440***	-0.356***		1.243	-0.453***	-0.383***
	[0.030]	[0.043]		[2.624]	[0.031]	[0.048]
Industry dummies	YES	NO	NO	YES	YES	NO
Region dummies	YES	NO	NO	YES	YES	NO
Year dummies	YES	YES	YES	YES	YES	YES
Time period	1996-2001	1996-2001	1996-2001	1996-2001	1997-2000	1997-2000
Adjusted R-squared	0.567				0.561	
R-squared (within)		0.044				0.046
Observations	89108	89108	62206	89108	76548	76548
Number of firms	26132	26132	20698	26132	25853	25853

** significant at 10%; ** significant at 5%; *** significant at 1%*

Robust standard errors, adjusted for clustering on firm id, in brackets. Column (3) reports Arellano and Bond (1991) one-step difference GMM results with robust standard errors. Column (4) reports Blundell and Bond (1998) system GMM results with robust standard errors.

Table 6A bis: Tests for regressions in Table 6A

DEPENDENT VARIABLE: Export Status	*Pooled OLS* (1)	*Fixed Effects* (2)	*GMM First Differences* (3)	*System GMM* (4)	*Pooled OLS* (5)	*Fixed Effects* (6)
F-test of joint significance of all explanatory variables (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of export status and export intensity (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of agglomeration measures (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of region dummies (p-value)	0.000			0.000	0.000	
F-test of joint significance of industry dummies (p-value)	0.000			0.000	0.000	
F-test of joint significance of time dummies (p-value)	0.000	0.000	0.043	0.000	0.000	0.000
Arellano-Bond test for AR(2) in first differences (p-value)			0.303	0.640		
Hansen test of overidentifying restrictions: chi2 (p-value)			0.832	0.513		

Table 6B: Export Decision - Spillovers from export intensity

Linear probability model results: Alternative estimation methods

DEPENDENT VARIABLE: Export Status	*Pooled OLS*	*Fixed Effects*	*GMM First Differences*	*System GMM*	*Pooled OLS*	*Fixed Effects*
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged export status	0.544***	-0.024***	0.228***	0.248***	0.534***	-0.090***
	[0.006]	[0.007]	[0.037]	[0.027]	[0.006]	[0.007]
Lagged export intensity (export share of turnover)	0.375***	0.210***	0.334	-0.230	0.380***	0.191***
	[0.015]	[0.027]	[0.781]	[0.557]	[0.016]	[0.029]
New firm	0.023***			0.129	0.024***	
	[0.002]			[0.163]	[0.002]	
Foreign ownership dummy					0.055***	-0.001
					[0.010]	[0.019]
Lagged log employment	0.044***	0.055***	0.784***	0.378***	0.045***	0.057***
	[0.001]	[0.005]	[0.254]	[0.137]	[0.001]	[0.006]
Lagged log labour productivity	0.017***	0.012***	0.284	0.179	0.017***	0.012***
	[0.001]	[0.002]	[0.416]	[0.185]	[0.001]	[0.002]
Lagged log fixed capital per worker	0.000	0.012***	-0.639	-0.304*	0.000	0.009**
	[0.001]	[0.003]	[0.433]	[0.164]	[0.001]	[0.004]
Lagged log average wage	-0.001	0.004	-0.717	-0.357	-0.001	0.007**
	[0.002]	[0.003]	[0.539]	[0.258]	[0.002]	[0.003]
Regional-industrial export intensity	0.044***	0.024**	0.070*	0.066	0.045***	0.015
(share of exports in output)	[0.008]	[0.011]	[0.042]	[0.086]	[0.009]	[0.011]
Sectoral export intensity (outside the region)	-0.022	-0.112***	0.181	0.069	-0.021	-0.117***
	[0.024]	[0.022]	[0.129]	[0.051]	[0.024]	[0.022]
Regional export intensity (outside sector)	-0.001	0.036*	0.023	0.203**	-0.004	0.029
	[0.019]	[0.019]	[0.065]	[0.083]	[0.021]	[0.020]
Constant	-0.314***	-0.250***		0.205	-0.318***	-0.301***
	[0.016]	[0.041]		[2.233]	[0.017]	[0.044]
Industry dummies	YES	NO	NO	YES	YES	NO
Region dummies	YES	NO	NO	YES	YES	NO
Year dummies	YES	YES	YES	YES	YES	YES
Time period	1996-2001	1996-2001	1996-2001	1996-2001	1997-2000	1997-2000
Adjusted R-squared	0.560				0.554	
R-squared (within)		0.019				0.022
Observations	87736	87736	60671	87736	75318	75318
Number of firms	25969	25969	20403	25969	25680	25680

** significant at 10%; ** significant at 5%; *** significant at 1%*

Robust standard errors, adjusted for clustering on firm id, in brackets. Column (3) reports Arellano and Bond (1991) one-step difference GMM results with robust standard errors. Column (4) reports Blundell and Bond (1998) system GMM results with robust standard errors.

Table 6B bis: Tests for regressions in Table 6B

DEPENDENT VARIABLE: Export Status	*Pooled OLS* (1)	*Fixed Effects* (2)	*GMM First Differences* (3)	*System GMM* (4)	*Pooled OLS* (5)	*Fixed Effects* (6)
F-test of joint significance of all explanatory variables (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of export status and export intensity (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of agglomeration measures (p-value)	0.000	0.000	0.398	0.001	0.000	0.000
F-test of joint significance of region dummies (p-value)	0.000			0.000	0.000	
F-test of joint significance of industry dummies (p-value)	0.000			0.000	0.000	
F-test of joint significance of time dummies (p-value)	0.000	0.000	0.143	0.000	0.000	0.000
Arellano-Bond test for AR(2) in first differences (p-value)			0.561	0.562		
Hansen test of overidentifying restrictions: chi2 (p-value)			0.642	0.513		

Table 7A: Export to developed countries - Spillovers from export propensity

Alternative estimation methods

DEPENDENT VARIABLE: Share of exports to developed countries in total exports	*OLS* (1)	*Fixed Effects* (2)	*Heckman* (3)	*OLS* (4)	*Fixed Effects* (5)	*Heckman* (6)
Lagged Share of exports to developed countries in total exports	0.421***	-0.255***	0.422***	0.417***	-0.430***	0.418***
	[0.012]	[0.013]	[0.005]	[0.013]	[0.019]	[0.006]
Lagged export status	0.053***	0.024***	0.054***	0.053***	0.005	0.053***
	[0.004]	[0.007]	[0.003]	[0.005]	[0.010]	[0.004]
New firm	0.008***		0.018***	0.005*		0.014***
	[0.003]		[0.004]	[0.003]		[0.005]
Foreign ownership dummy				0.049***	-0.015	0.051***
				[0.012]	[0.033]	[0.007]
Lagged log employment	0.010***	0.013*	0.010***	0.011***	0.026***	0.011***
	[0.001]	[0.007]	[0.001]	[0.001]	[0.009]	[0.001]
Lagged log labour productivity	0.007***	0.002	0.005***	0.007***	0.002	0.006***
	[0.001]	[0.003]	[0.001]	[0.001]	[0.003]	[0.002]
Lagged log fixed capital per worker	0.001	0.003	0.001	0.000	0.005	0.000
	[0.001]	[0.004]	[0.001]	[0.001]	[0.007]	[0.001]
Lagged log average wage	0.000	-0.007	0.001	-0.001	0.004	0.000
	[0.002]	[0.004]	[0.002]	[0.002]	[0.005]	[0.002]
Regional-industrial export propensity (% exporters over total firms)	0.211***	0.350***	0.214***	0.224***	0.327***	0.226***
	[0.016]	[0.044]	[0.012]	[0.018]	[0.055]	[0.014]
Sectoral export propensity (outside the region)	-0.529**	-0.434*	-0.537**	-0.666	-0.538	-0.647*
	[0.235]	[0.241]	[0.218]	[0.467]	[0.391]	[0.375]
Regional export propensity (outside sector)	0.198**	0.054	0.207***	0.140	0.034	0.158
	[0.091]	[0.083]	[0.079]	[0.141]	[0.118]	[0.119]
Constant	-0.042	0.021	-0.034	-0.004	-0.084	0.004
	[0.074]	[0.067]	[0.068]	[0.145]	[0.100]	[0.115]
Industry dummies	YES	NO	YES	YES	NO	YES
Region dummies	YES	NO	YES	YES	NO	YES
Year dummies	YES	YES	YES	YES	YES	YES
Time period	1998-2001	1998-2001	1998-2001	1998-2000	1998-2000	1998-2000
Adjusted R-squared	0.342			0.340		
R-squared (within)		0.075			0.194	
Observations	44283	44283	51118	32225	32225	38558
Censored observations			6835			6333
Uncensored observations			44283			32225
Number of firms	19785	19785	19785	19785	19356	19785

** significant at 10%; ** significant at 5%; *** significant at 1%*

Robust standard errors, adjusted for clustering on firm id, in brackets. Columns (3) and (6) report results of the Heckman (1979) regression model with sample selection, with two-step efficient estimates of parameters and standard errors.

Table 7A bis: Tests for regressions in Table 7A

DEPENDENT VARIABLE: Share of exports to developed countries in total exports						
	OLS	*Fixed Effects*	*Heckman*	*OLS*	*Fixed Effects*	*Heckman*
	(1)	(2)	(3)	(4)	(5)	(6)
F-test of joint significance of all explanatory variables (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of export status and exports to developed countries (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of agglomeration measures (p-value)	0.000					
F-test of joint significance of region dummies (p-value)	0.000		0.000	0.000		
F-test of joint significance of industry dummies (p-value)	0.000		0.000	0.000		
F-test of joint significance of time dummies (p-value)	0.000	0.000	0.000	0.005	0.159	0.000
Mills: Lambda			-0.032***			-0.024**
			[0.011]			[0.012]
Rho			-0.172			-0.126
Sigma			0.185			0.189

Note: In columns (3) and (6) Wald tests with a chi2 distribution.

Table 7B: Export to developed countries - Spillovers from export intensity

Alternative estimation methods

DEPENDENT VARIABLE: Share of exports to developed countries in total exports	*OLS* (1)	*Fixed Effects* (2)	*Heckman* (3)	*OLS* (4)	*Fixed Effects* (5)	*Heckman* (6)
Lagged Share of exports to developed countries in total exports	0.424***	-0.249***	0.425***	0.423***	-0.433***	0.423***
	[0.012]	[0.013]	[0.005]	[0.013]	[0.019]	[0.006]
Lagged export status	0.058***	0.022***	0.059***	0.058***	0.000	0.058***
	[0.004]	[0.008]	[0.003]	[0.005]	[0.010]	[0.004]
New firm	0.008***		0.019***	0.005*		0.013***
	[0.003]		[0.004]	[0.003]		[0.005]
Foreign ownership dummy				0.050***	-0.007	0.051***
				[0.012]	[0.034]	[0.007]
Lagged log employment	0.011***	0.015**	0.010***	0.012***	0.028***	0.011***
	[0.001]	[0.007]	[0.001]	[0.001]	[0.009]	[0.001]
Lagged log labour productivity	0.007***	0.003	0.005***	0.007***	0.003	0.006***
	[0.001]	[0.003]	[0.001]	[0.001]	[0.003]	[0.002]
Lagged log fixed capital per worker	0.001	0.004	0.001	0.000	0.006	0.000
	[0.001]	[0.004]	[0.001]	[0.001]	[0.007]	[0.001]
Lagged log average wage	-0.001	-0.008*	0.001	-0.001	0.002	0.000
	[0.002]	[0.004]	[0.002]	[0.002]	[0.005]	[0.002]
Regional-industrial export intensity (share of exports in output)	0.051***	0.033***	0.055***	0.043***	0.031**	0.045***
	[0.009]	[0.013]	[0.007]	[0.010]	[0.016]	[0.008]
Sectoral export intensity (outside the region)	-0.088	-0.010	-0.086*	-0.170*	-0.135	-0.168**
	[0.059]	[0.052]	[0.050]	[0.098]	[0.082]	[0.072]
Regional export intensity (outside sector)	0.010	0.045	0.016	-0.021	0.000	-0.017
	[0.033]	[0.028]	[0.030]	[0.047]	[0.038]	[0.039]
Constant	-0.119***	0.023	-0.094***	-0.121***	-0.104	-0.102***
	[0.015]	[0.062]	[0.017]	[0.018]	[0.084]	[0.020]
Industry dummies	YES	NO	YES	YES	NO	YES
Region dummies	YES	NO	YES	YES	NO	YES
Year dummies	YES	YES	YES	YES	YES	YES
Time period	1998-2001	1998-2001	1998-2001	1998-2000	1998-2000	1998-2000
Adjusted R-squared	0.336			0.334		
R-squared (within)		0.067			0.193	
Observations	43668	43668	49940	31722	31722	37522
Censored observations			6272			5800
Uncensored observations			43668			31722
Number of firms	19656	19656	19656	19208	19208	19208

** significant at 10%; ** significant at 5%; *** significant at 1%*

Robust standard errors, adjusted for clustering on firm id, in brackets. Columns (3) and (6) report results of the Heckman (1979) regression model with sample selection, with two-step efficient estimates of parameters and standard errors.

Table 7B bis: Tests for regressions in Table 7B

DEPENDENT VARIABLE: Share of exports to developed countries in total exports						
	OLS	*Fixed Effects*	*Heckman*	*OLS*	*Fixed Effects*	*Heckman*
	(1)	(2)	(3)	(4)	(5)	(6)
F-test of joint significance of all explanatory variables (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of export status and exports to developed countries (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
F-test of joint significance of agglomeration measures (p-value)	0.000					
F-test of joint significance of region dummies (p-value)	0.000		0.000	0.000		
F-test of joint significance of industry dummies (p-value)	0.000		0.000	0.000		
F-test of joint significance of time dummies (p-value)	0.000	0.000	0.000	0.005	0.003	0.000
Mills: Lambda			-0.034***			-0.023*
			[0.011]			[0.012]
Rho			-0.182			-0.122
Sigma			0.185			0.189

Note: In columns (3) and (6) Wald tests with a chi2 distribution.

Table 8: Institutional quality and exporting in 2001

DEPENDENT VARIABLE	Export Status	Share of exports to developed countries in total exports	
	OLS	*OLS*	*Heckman*
	(1)	(2)	(3)
1998-2000 share of exports to developed countries in total exports		0.510***	0.502***
		[0.021]	[0.010]
1996-2000 export intensity (export share of turnover)	0.414***		
	[0.035]		
Lagged export status	0.632***	0.089***	0.091***
	[0.012]	[0.008]	[0.005]
New firm	0.017***	0.013***	0.011***
	[0.005]	[0.004]	[0.004]
1995-2000 average log employment	0.031***	0.001	0.000
	[0.002]	[0.002]	[0.001]
1995-2000 average log labour productivity	0.006**	0.003	0.006**
	[0.003]	[0.002]	[0.002]
1995-2000 average log capital intensity	0.003*	0.000	-0.002
	[0.002]	[0.002]	[0.002]
1995-2000 average log average wage	0.006	0.004	0.003
	[0.005]	[0.004]	[0.004]
Small enterprises per capita in the region, 1995-2001 average	-0.289	-0.022	0.121
	[0.574]	[0.474]	[0.354]
Share of extraction industries in GRIP, 1995-2001 average	-0.000*	0.000	0.000
	[0.000]	[0.000]	[0.000]
Index of Regulatory Capture, 1995-2000 average	**0.000**	**-0.038*** **	**-0.030** **
	[0.021]	**[0.013]**	**[0.015]**
Corruption of judicial process (enterpreneurs' perception)	**-0.091***	**-0.060**	**-0.086** **
	[0.054]	**[0.040]**	**[0.042]**
Constant	-0.167***	-0.018	-0.028
	[0.040]	[0.030]	[0.031]
Adjusted R-squared	0.591	0.35	
Observations	12362	11672	12723
Censored observations			1051
Uncensored observations			11672

** significant at 10%; ** significant at 5%; *** significant at 1%*
Columns (1) and (2) report OLS estimates with robust standard errors, adjusted for clustering on firm id, in brackets.

Column (3) reports results of the Heckman regression model with sample selection, with two-step efficient estimates of parameters and standard errors. The selection model includes all explanatory variables in the main regression with the addition of industry dummies and region dummies.

Table 8 bis: Tests for regressions in Table 8

DEPENDENT VARIABLE	Export Status	Share of exports to developed countries in total exports	
	OLS	*OLS*	*Heckman*
	(1)	(2)	(3)
F-test of joint significance of all explanatory variables (p-values)	0.000	0.000	0.000
F-test of joint significance of export status and export intensity (p-values)	0.000		
F-test of joint significance of export status and export to developed countries (p-values)		0.000	0.000
F-test of joint significance of economic and institutional variables (p values)	0.137	0.000	0.000
Mills: Lambda			0.073*** [0.022]
Rho			0.417
Sigma			0.174

Note: In column (3) Wald tests with a chi2 distribution.

Appendix A: Data sources

Regional level datasets

Goskomstat Yearbook of Russian Regions (1970-2001)
It contains many economic and social regional indicators. In the present study use is made of the yearbook for the construction of region-specific variables, such as SME per capita and incidence of extractive industries in Gross Regional Industrial Production.

Transparency International: Regional Corruption Indices (2002)
The survey was conducted by Transparency International. The corruption indices have been built on the basis of a sociological survey embracing 5666 individuals and 1838 entrepreneurs representing small and medium sized businesses in 40 Russia's regions. The authors aimed to present a three-dimensional picture of corruption in Russia, embracing both everyday and business corruption, both estimation characteristics and the indicators characterizing corruption practices, as well as present indicators generalizing different dimensions of corruption and allowing to compare overall situation across regions. The survey was used for the variable describing entrepreneurs' perception of corruption in the judicial process. The survey results were kindly provided by Evgeniy Yakovlev.

Index of Regulatory Capture (1995-2000)
This index is constructed by Slinko et al. (2005) for 73 Russian regions. It is computed by considering regional laws containing preferential treatment for the five largest non-state firms and the larger SOEs on a regional basis. The index is directly used in the analysis and was kindly provided by Ekaterina Zhuravskaya.

Firm level datasets

RERLD (1995-2001)
The Russian Enterprise Registry Longitudinal Database (RERLD) is an annual enterprise census conducted by Goskomstat, the Russian statistical agency. It contains, among other variables, balance sheet information on, sales, total cost, number of employees, wages, book value of capital, subsidies and 2, 3 and 5 digit industry codes. It includes all Russian industrial firms with over one hundred employees, all state-owned enterprises, and non-state firms with fewer than one hundred employees that are up to 75% individually owned. For a detailed description of the RERLD see Brown and Brown (1999). The census is utilized for the construction of firm-specific variables and their deviations from sectoral means: employment, output per worker, capital intensity, average wage. The output and capital five-digit industry deflators were incorporated in the database and kindly provided by Evguenia Bessonova.

Customs Export Database (1996-2001)
It contains all transactions, specifying commodity, value, firm and, starting in 1998, country of destination. It can be matched with the RERLD by way of a unique firm identifier. It was employed to identify exporting firms and the total value of their export in each year. This database was kindly provided by Konstantin Kozlov who also provided irreplaceable assistance for its cleaning and matching with the main database.

RFOF (1997-2000)
The Registry of Foreign Owned Firms (RFOF) is an annual enterprise census, which includes all fully or partially foreign owned firms operating in the Russian Federation. It contains, among other variables, detailed information on foreign ownership, such as shareholding and country of the investor. It can be partly matched with the RERLD by employing unique firm identifiers. The RFOF was used to construct and match the dummy variable for foreign ownership. For a detailed description of the RFOF see Yudaeva et al. (2003).

Appendix B: Definition of "new" firms

A cut-off point to define an enterprise as new may be identified in 1991, the year in which the Soviet Union officially ceased to exist. The table below shows the average size of new entrants in the census in 1992, 1993 and 1994 to be at odds with the fact that they are new firms, since these are likely to be small at the outset. This might mean that most new entrants are not new firms but simply old Soviet concerns that, for some reason, are being reclassified with a new identifier. A smaller average size of new entries can thus offer a guiding principle to spot a more appropriate cut-off point. A sharp drop in the average employment of new admissions to the database can be observed in 1995. This might suggest 1994 as a more suitable discontinuity, coinciding with the year in which the first wave of voucher privatisation was implemented. Rather than by the inclusion of new firms, the sharp drop in average size could, admittedly, be generated by the restructuring that may have occurred after the formal transfer of ownership into private hands. Another possible explanation could be the inclusion of spin-offs of traditional enterprises. Nonetheless, even accounting for the evident built in defects in the data, 1994 appears as a more appropriate cut-off point to obtain an approximate impression of the behaviour of new private firms.

Table B1: The size of firms by year of inclusion in the census

Year of inclusion	*Number of firms*	*Percent*	*Average employment of new entrants*
1985	132636	36.11	505
1986	245	0.07	395
1987	266	0.07	625
1988	91	0.02	241
1989	91	0.02	469
1990	728	0.20	1133
1991	19453	5.30	513
1992	30590	8.33	1280
1993	24178	6.58	595
1994	22589	6.15	320
1995	35651	9.71	150
1996	14098	3.84	169
1997	24969	6.80	180
1998	16898	4.60	195
1999	17486	4.76	217
2000	15918	4.33	204
2001	11382	3.10	152

Overall, given the scarce incentives that authentically new firms may have to report to Goskomstat, our definition of "new" firms is best interpreted with caution, and as including, for the most part, traditional firms, or at least their human and physical assets, that underwent transformation in the aftermath of voucher privatisation. Nonetheless, in a less conventional sense, these firms may be considered as non-traditional, in that they are more likely to have experienced a profound transformation of sorts, involving, perhaps, restructuring of industrial operations and a novel stance towards market conditions.

Appendix C: A model of the export decision

Building upon the approach of Bernard and Jensen (2001), the decision to export can be modelled as follows. Let

$$\pi_{it}\left(X_{it},Z_t,A_i\right)=p_t\cdot q_{it}^{*}-c_{it}\left(X_{it},Z_t,A_i\middle|q_{it}^{*}\right) \tag{C1}$$

be the profits derived from exporting activity that a firm receives in any period *t*. Profits in export markets are given by export revenues - with p_t being the exogenous international price for the firm's product and q^{*}_{it} the profit-maximizing export quantity – minus the firm's variable cost of production. This cost depends on a number of features both internal and external to the firm. X_{it} incorporates firm-specific characteristics, such as size, productivity, capital intensity, ownership structure, and spillovers from the activity of neighbouring exporters. Z_t represents a set of exogenous time-dependent market-level variables, such as exchange rates and demand conditions for the firm's product. A_i stands for a number of exogenous firm-specific characteristics that are stable in the short run, such as the firm's sector of operation and structural features of the economic and institutional environment.

The export decision of the firm in any given period will depend on whether export profits for the period, as well as the discounted expected stream of future profits, are non-negative. The export status of firm *i* in period *t*, Y_{it}, will be determined as follows:

$$\begin{aligned} &Y_{it}=1 \text{ if } \pi_{it}\left(X_{it},Z_t,A_i\right)\geq 0 \\ &Y_{it}=0 \text{ if } \pi_{it}\left(X_{it},Z_t,A_i\right)<0 \end{aligned} \tag{C2}$$

The single period profit equation (C1) can be extended to a multi-period framework. The firm's expected profits become

$$\Pi_{it}\left(X_{it},Z_t,A_{it}\right)=E_t\left\{\sum_{s=t}^{\infty}\delta^{s-t}\left[p_s\cdot q_{is}^{*}-c_{is}\left(X_{is},Z_s,A_i\middle|q_{is}^{*}\right)\right]\right\} \tag{C3}$$

If the learning-by-exporting hypothesis holds, it is possible to assume that costs in the current period are positively influenced by the firm's past exporting experience, for instance, if the firm becomes more efficient at making its exported good by virtue of the know-how acquired in the past. Specifically, it can be assumed that

$$c_{it}=c_{it}\left(X_{it},Z_t,A_i,q_{it-1}^{*}\middle|q_{it}^{*}\right) \qquad \text{with} \qquad \frac{\partial c_{it}(\cdot)}{\partial\left(q_{it-1}^{*}\right)}<0 \tag{C4}$$

Thus, allowing for an influence of past experience on exporting behaviour, the single period profit function becomes:

$$\hat{\pi}_{it}\left(X_{it},Z_t,A_i,q_{it-1}^{*}\right)=p_t\cdot q_{it}^{*}-c_{it}\left(X_{it},Z_t,A_i,q_{it-1}^{*}\middle|q_{it}^{*}\right) \tag{C5}$$

while the value function in a dynamic framework is given by:

$$V_{it}(\cdot)=\max_{q_{it}^{*}}\left\{\hat{\pi}_{it}\cdot Y_{it}+\delta E_t\left[V_{it+1}(\cdot)\middle|q_{it}^{*}\right]\right\} \tag{C6}$$

Accordingly, the firm's export decision in period *t* would be based on an assessment of present and expected future profit streams. Therefore, $Y_{it}=1$ if

$$\hat{\pi}_{it}+\delta E_t\left[V_{it+1}(\cdot)\middle|q_{it}^*>0\right]>\delta E_t\left[V_{it+1}(\cdot)\middle|q_{it}^*=0\right] \quad \text{(C7)}$$

A further complication is now contemplated in the model. When a firm enters export markets it is likely to incur sunk costs, associated, for example, with the acquisition of information regarding foreign market conditions or with the establishment of a distribution network. As in Dixit (1989) these costs represent the direct monetary cost of entering a new market. Sunk costs, σ, are assumed to be present in the current period if the firm did not export in the previous period, that is if $Y_{it-1}=0$.[27] The single period profit function with sunk cost of entry will be:

$$\tilde{\pi}_{it}\left(X_{it},Z_t,A_i,q_{it-1}^*\right)=p_t\cdot q_{it}^*-c_{it}\left(X_{it},Z_t,A_i,q_{it-1}^*\middle|q_{it}^*\right)-\sigma\left(1-Y_{it-1}\right) \quad \text{(C8)}$$

with

$\sigma>0$ if $q_{it-1}^*=0$.

The modified value function, comprising both past experience and the eventuality of sunk costs, in a multi-period framework is given by:

$$W_{it}(\cdot)=\max_{q_{it}^*}\left\{\tilde{\pi}_{it}\cdot Y_{it}+\delta E_t\left[W_{it+1}(\cdot)\middle|q_{it}^*\right]\right\} \quad \text{(C9)}$$

As before, the firm will decide to export if

$$\tilde{\pi}_{it}+\delta E_t\left[W_{it+1}(\cdot)\middle|q_{it}^*>0\right]>\delta E_t\left[W_{it+1}(\cdot)\middle|q_{it}^*=0\right] \quad \text{(C10)}$$

Returning to binary formulation, the firm's decision to export in period *t* – production of a non-negative q^*_{it} - will be determined according to the following decision rule:

$$\begin{aligned} &Y_{it}=1 \text{ if } \tilde{\pi}_{it}\left(X_{it},Z_t,A_i,q_{it-1}^*\right)\geq 0 \\ &Y_{it}=0 \text{ if } \tilde{\pi}_{it}\left(X_{it},Z_t,A_i,q_{it-1}^*\right)<0 \end{aligned} \quad \text{(C11)}$$

where

$$\tilde{\pi}_{it}=\left[p_t\cdot q_{it}^*-c_{it}\left(X_{it},Z_t,A_i,q_{it-1}^*\middle|q_{it}^*\right)-\sigma\left(1-Y_{it-1}\right)\right]+\delta E_t\left[W_{it+1}(\cdot)\middle|q_{it}^*>0\right]-\delta E_t\left[W_{it+1}(\cdot)\middle|q_{it}^*=0\right] \quad \text{(C12)}$$

is the latent variable underlying the decision to export. The decision rule can also be formulated as follows. Firm *i* will decide to enter the export market in period *t* if

$$p_t\cdot q_{it}^*+\delta\left\{E_t\left[W_{it+1}(\cdot)\middle|q_{it}^*>0\right]-E_t\left[W_{it+1}(\cdot)\middle|q_{it}^*=0\right]\right\}>c_{it}\left(X_{it},Z_t,A_i,q_{it-1}^*\middle|q_{it}^*\right)+\sigma\left(1-Y_{it-1}\right) \quad \text{(C13)}$$

In other terms, the firm will decide to enter the export market in the current period if this period's export revenues, augmented by a comparison of the discounted future values of entering versus not entering today, exceeds the variable cost of production plus the sunk costs of entry.

[27] Roberts and Tybout (1997) generalize the modelling of sunk costs by allowing them to depend on the length of absence from the market.

Appendix D: Indicators of institutional quality

Region	*Index of Regulatory Capture (Slinko et al., 2005)*	*Entrepreneurs' perception of Judicial Corruption (Transparency International)*
Chelyabinsk oblast	0.416	0.554
Komi republic	0.403	
Udmurtia Republic	0.258	0.600
Tatarstan republic	0.213	0.629
Kurgan oblast	0.189	0.555
Magadan oblast	0.189	
Murmansk oblast	0.189	
Orenburg oblast	0.178	
Kursk oblast	0.163	
Tomsk oblast	0.140	0.669
Kabardino-Balkar republic	0.137	
Omsk oblast	0.135	0.587
Vologda oblast	0.134	
Vladimir oblast	0.122	
Bryansk oblast	0.093	
Kirov oblast	0.079	
Moscow city	0.073	0.637
Tyumen oblast	0.069	0.564
Stavropol krai	0.064	0.608
Sakha (Yakutia) republic	0.058	
Altai republic	0.053	
Krasnodar krai	0.053	0.677
Mordovia republic	0.042	
Tula oblast	0.042	0.630
Moscow oblast	0.039	0.620
Penza oblast	0.037	
Amur oblast	0.036	0.585
Khakasia republic	0.024	
Krasnoyarsk krai	0.024	0.595
Mari-El republic	0.024	
Volgograd oblast	0.016	0.623
Rostov oblast	0.012	0.622
Dagestan republic	0.010	
Kostroma oblast	0.002	
Perm oblast	0.001	0.629
Bashkortostan republic	0.000	0.564
Kemerovo oblast	-0.002	0.611
Lipetsk oblast	-0.002	
Tver oblast	-0.002	0.658
Adygeya republic	-0.003	
Sverdlovsk oblast	-0.005	0.611
Nizhny Novgorod oblast	-0.006	0.546
Kaliningrad oblast	-0.013	
Saratov oblast	-0.015	0.589
Altai krai	-0.026	0.606
Chita oblast	-0.026	
Karelia republic	-0.032	0.575
Samara oblast	-0.046	0.580
Evrei autonomous oblast	-0.071	
Novgorod oblast	-0.071	
Primorskii krai	-0.071	0.573
Pskov oblast	-0.071	0.501
Belgorod oblast	-0.087	0.567
Voronezh oblast	-0.088	0.601
Khabarovsk krai	-0.097	0.663
Smolensk oblast	-0.098	
Astrakhan oblast	-0.101	
Yaroslavl oblast	-0.114	0.519
Sakhalin oblast	-0.120	
Ivanovo oblast	-0.125	
Ulyanovsk oblast	-0.126	0.502
Tambov oblast	-0.137	0.559
Kaluga oblast	-0.141	
Novosibirsk oblast	-0.150	0.614
Oryol oblast	-0.154	
Karachaevo-Cherkess republic	-0.167	
Ryazan oblast	-0.167	0.613
Chuvash republic	-0.195	
St. Petersburg city	-0.195	0.592
Kamchatka oblast	-0.236	
Arkhangelsk oblast	-0.306	0.486
Irkutsk oblast	-0.306	
Leningrad oblast		0.651